Math 361 **Numerical Analysis**
10/24/19 Quiz 8

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Name

Answer the following questions in the space provided. **Show all work.** (20 pts. total.)

1. Let $P(x) = -3x^4 + x^3 - 2x^2 + 3x + 3$ on $[0, 2]$, and let $x_0 = 1$. Use Newton's Method and synthetic division (Horner's Method) to compute x_1. (10 pts.)

$g(x) = x - \frac{f(x)}{f'(x)}$: $x_1 = g(x_0)$

1	-3	1	-2	3	3
		↓ -3	-2	-4	-1
	-3	-2	-4	-1	2 → $f(x_0)$
		↓ -3	-5	-9	
	-3	-5	-9	-10 → $f'(x_0)$	

$x_1 = 1 + \frac{2}{10} = 1 + \frac{1}{5} = \frac{6}{5} = 1.2$

$x_1 = 1.2$

2. Use the following data to set up, but do not simplify, the associated second degree interpolating Lagrange polynomial. (10 pts.)

x	$f(x)$
0.4	2.4928
0.6	1.4368
0.7	0.7828

$L_2(x) = \frac{(x-0.6)(x-0.7)}{(0.4-0.6)(0.4-0.7)}(2.4928) + \frac{(x-0.4)(x-0.7)}{(0.6-0.4)(0.6-0.7)}(1.4368) + \frac{(x-0.4)(x-0.6)}{(0.7-0.4)(0.7-0.6)}(0.7828)$